GRASSROOTS JOURNALS

**Grassroots Journal of Natural Resources**, Vol.8 No.2 (August 2025)
ISSN: 2581-6853 | CODEN: GJNRA9 | Published by The Grassroots Institute
Website: https://grassrootsjournals.org/gjnr | Main Indexing: Scopus and WoS

**ISSN 2581-6853 | 8(2) August 2025**

**00563 | Research Article**

# Culture-Based Urban Development and Sustainability: Experiences from Hungary's European Capitals of Culture and Implications for Győr

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***How to cite this paper*:** Kara, *Z.,* Szombathelyi, M.K. and Kucsera, G.T. (2025). Culture-Based Urban Development and Sustainability: Experiences from Hungary's European Capitals of Culture and Implications for Győr. *Grassroots Journal of Natural Resources,* 8(2): 276-305. Doi: https://doi.org/10.33002/nr2581.6853.080214

**Received**: 28 May 2025
**Reviewed**: 25 July 2025
**Provisionally Accepted:** 30 July 2025
**Revised**: 10 August 2025
**Finally Accepted:** 12 August 2025
**Published:** 23 August 2025
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## Abstract

This study explores the intersection of culture-based urban development and sustainability through the lens of urban ecology, drawing on the European Capital of Culture (ECoC) programs in Veszprém-Balaton 2023 and Pécs 2010. It addresses the previously limited integration of ecological considerations in culture-based urban policies, highlighting how recent ECoC initiatives, such as Veszprém-Balaton 2023, have increasingly embraced ecological perspectives. The study further investigates how ecological principles can be embedded in cultural strategies to strengthen regional identity and promote long-term urban resilience. Using an interdisciplinary framework, the research integrates literature review, qualitative data analysis, and comparative case study methods. Data sources include ECoC Bidbooks, municipal strategic documents, programme evaluations, and peer-reviewed literature. Key focus areas include brownfield regeneration, low-emission transport, and community-based cultural practices, with emphasis on the ecological roles culture can play in transforming urban environments. The findings show that ECoC programmes can serve as catalysts for both cultural renewal and sustainable urban development. In the case of Veszprém-Balaton 2023, former industrial zones were creatively reused for cultural purposes, supported by initiatives promoting green mobility and circular resource use. Infrastructure projects, such as cultural spaces developed with sustainability criteria, and measures like reusable cup systems and eco-conscious transport solutions contributed to reduced environmental footprints and enhanced public participation. This study addressed ecological dimensions of culture-based urban development by contrasting awarded (Pécs, Veszprém) and non-awarded (Győr) cities. By synthesising lessons from ECoC programmes, it introduces a model for integrating cultural programming with ecological planning, offering scalable approaches for sustainable cultural investment. Future work may investigate Győr's evolving cultural strategy through an ecological lens, assess long-term outcomes of ECoC projects, and examine cross-regional interconnections in cultural-ecological networks.

## Keywords

Urban ecology; Culture-based development; European capital of culture; Sustainability; Regional identity

## Introduction

Urban development practices in recent decades have been shaped by various theoretical approaches responding to the challenges of globalisation, environmental crises, resource scarcity, and social tensions. These include the model based on economic competitiveness (Harvey, 1989), the innovation-focused "smart city" concept (Batty *et al.,* 2012), socially inclusive urban policies (Lees, 2008), and the urban ecological approach aimed at environmental sustainability (Beatley, 2000). Each emphasises different priorities: efficiency, justice, technological advancement, or environmental stability. Alongside these, culture-based urban development has become increasingly prominent, approaching sustainability through urban heritage, the creative economy, and community identity (Evans, 2005; Landry, 2000; Throsby, 2001). This model extends beyond event-driven programs, interpreting culture as a strategic force in urban transformation. The concept of sustainability has evolved since the 1970s. The term "sustainable development" gained early prominence in the report The Limits to Growth (Meadows *et al*., 1972) and later achieved its widely accepted definition in the Brundtland Report (Keserű, 2024). According to this definition, sustainable development is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". The three-pillar model: environmental, economic, and social, remains central but has since been expanded with a fourth dimension: culture. Culture, as the fourth pillar of sustainability, is not merely a social component but a medium that connects and enables the interpretation of the other three pillars, economic, social, and environmental (Hawkes, 2001; Pickett, Cadenasso and McGrath, 2011). It shapes identity, values, community participation, and memory, thereby playing a key role in structuring urban sustainability. The European Capital of Culture (ECoC) program, launched by the European Union in 1985, aims not only to celebrate cultural diversity but also to promote the long-term development of cities through cultural tools. The ECoC title is more than a collection of cultural events; it is a policy instrument that shapes urban futures through the creation of new spaces and the fostering of public participation. This study addresses the uneven and evolving integration of ecological considerations in culture-based urban development strategies in Hungary. While earlier approaches (e.g., Pécs 2010) showed limited ecological focus, recent programmes like Veszprém-Balaton 2023 demonstrate more explicit environmental commitments. At the same time, cities such as Győr, despite lacking the ECoC title, have developed autonomous and coherent cultural-ecological strategies. Although the cultural dimensions of sustainability have gained increasing recognition in policy, their ecological integration, especially within the ECoC framework, remains underexplored in Hungarian and regional urban studies literature. This study addresses this gap by offering a comparative, ecologically-informed analysis of three cities with divergent ECoC experiences. In Hungary, investments associated with the title were primarily funded by national sources, with EU contributions playing a secondary role (Lőrincz, Raffay-Danyi and Cerquetti, 2021). Still, the creation of new cultural spaces is often aligned with the goals of community participation and environmental sustainability. Focusing on three Hungarian cities, Pécs, Veszprém, and Győr, it analyses policy responses related to the ECoC title or its absence, with particular attention to community participation, ecological sustainability, and opportunities for cultural–ecological integration. Ultimately, the research outlines a model for integrated urban

development that may contribute to transforming future cultural urban policies towards sustainability.

## Methodology

### *Study Area and Theoretical Framework: Urban Ecology and Culture-Based Urban Development*

Urban ecology is an interdisciplinary approach that interprets cities as dynamic ecosystems where social, economic, and environmental systems interact continuously (Grimm *et al*., 2008; Pickett *et al*., 2011). It not only examines the relationship between living systems and the built environment but also highlights how urban planning and development policy can contribute to sustainability goals. Linking urban ecology with culture-based urban development is particularly timely for addressing complex urban issues such as social exclusion, brownfield redevelopment, or adaptation to climate-related risks (Chan, Satterfield and Goldstein, 2012). These interdisciplinary relationships can be effectively conceptualised using the Triple–Quadruple–Quintuple Helix Model, which illustrates how innovation emerges from the interaction among academia, government, industry, civil society, and the natural environment. It explains how to use sustainability strategies in cities, focusing on culture, knowledge, and environmental awareness. It gives a strong foundation for understanding these concepts (Potryvaieva, 2025). The evolution of this model, from the basic Triple Helix to its expanded ecological version, visually encapsulates the complex processes that underpin sustainable urban innovation (see Figure 1).

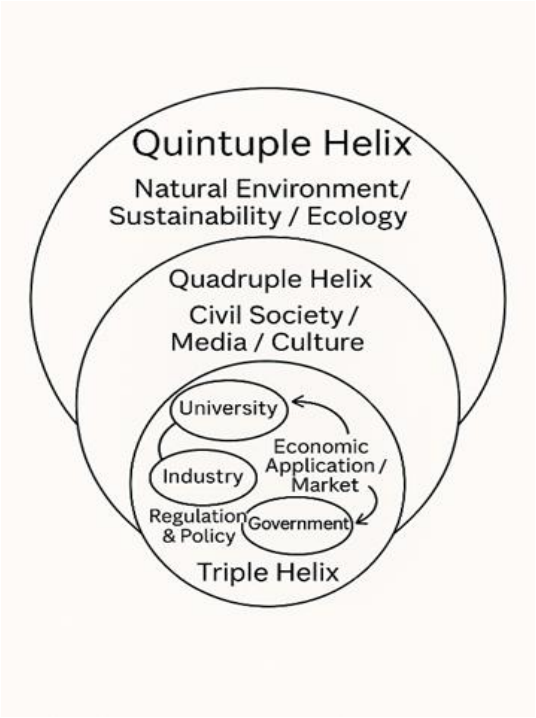


Figure 1: The Triple, Quadruple, and Quintuple Helix Innovation Models

The above model demonstrates how innovation processes evolve from the interaction between university, industry, and government (Triple Helix), to a more comprehensive system including civil society (Quadruple Helix), and finally to the integration of the natural environment (Quintuple Helix). This framework, based on Carayannis and Campbell (2010), highlights the role of sustainability as a central driver in knowledge-based regional development.

Culture plays a role beyond aesthetics or representation: cultural infrastructure, heritage, creative industries, and civic participation can all contribute to making cities more resilient and inclusive. Tools of culture-based development include cultural programs, community art initiatives, and creative interventions that shape urban space (Clark and Dickson, 2003; Garcia, 2004). These not only enrich urban environments with new content but also support social cohesion, participatory processes, and the reinforcement of identity. The cultural dimension of sustainability is increasingly recognised in urban development. As a fourth pillar, culture enables environmental and social goals to be aligned with local community values and knowledge networks (Elkington, 1997; Hawkes, 2001). This perspective supports place-specific development projects that are technologically and economically efficient, as well as socially acceptable and environmentally sensitive. The European Capital of Culture program demonstrates how culture can drive urban transformation. Cities involved often aim not only for enhanced cultural offerings but also for the strengthening of ecological and social sustainability (Ciuculescu and Luca, 2024; García and Cox, 2013). Securing the title provides opportunities for long-term strategic planning, enhanced civic engagement, and the formation of new urban fabrics. The intersection of culture-based urban development and sustainability is multifaceted, encompassing historical identity, community resilience, economic diversification, and ecological awareness. Recent studies suggest that the preservation of cultural landscapes, particularly through sustainable tourism, can serve as a powerful mechanism for reinforcing local agency and fostering long-term regional development (Li *et al.,* 2025). This perspective becomes especially relevant in urban contexts where heritage-based interventions coexist with modernisation imperatives.

### *Sampling Methods*

This study follows a purposive case selection approach. Three Hungarian cities were selected, (1) Pécs (European Capital of Culture, 2010), (2) Veszprém-Balaton (ECoC 2023), and (3) Győr, a city that submitted two unsuccessful ECoC bids but still developed a long-term culture-based urban strategy. This selection enables comparative insights across different ECoC statuses – past, current, and non-awarded applicants.

### *Research Tools*

This study applies an interdisciplinary approach, drawing on urban ecology, cultural studies, urbanism, and the social sciences. It combines literature review, qualitative data analysis, and comparative case studies to examine how ECoC programmes support sustainability, particularly in terms of cultural infrastructure, civic participation, and environmental efforts.

### *Research Objectives and Key Questions*

This study aims to examine how urban ecological principles can be integrated into culture-based urban development strategies, with particular focus on the European Capital of Culture (ECoC) programmes in Pécs (2010) and Veszprém-Balaton (2023), as well as a comparative reflection on the cultural strategy of the city of Győr. The main research questions are:

(1) In what ways can ECoC-related urban development contribute to sustainability goals?
(2) Which urban ecological principles were implemented in the Pécs 2010 and Veszprém-Balaton 2023 programmes?
(3) How does Győr's approach compare, as a city that pursued significant cultural and infrastructural development without receiving the ECoC title?

### *Measurement of Major Indicators*

The analysis is guided by four thematic dimensions that serve as major indicators of culture-based urban sustainability, applied consistently across all three cities. These dimensions include brownfield revitalization and urban space transformation, which focus on repurposing underutilized land; sustainable transport and mobility solutions that aim to improve urban connectivity while minimizing environmental impact; community participation and civic engagement, emphasizing the importance of involving residents in decision-making processes; and finally, environmental awareness and sustainable event practices, which seek to promote eco-friendly initiatives during public gatherings. Together, these elements provide a comprehensive framework for assessing urban sustainability in each city. In addition to the thematic dimensions described above, a six-dimensional interpretive model was developed to support the comparative analysis. This radar-based framework includes: cultural decentralisation, ecological integration, participatory governance, cultural continuity, adaptive reuse of brownfields, and strategic embedding. While not intended for precise quantification, the model offers a visual synthesis of contrasting developmental logics. The criteria were derived from relevant scholarly literature and adapted from European Capital of Culture (ECoC) monitoring and evaluation guidelines.

### *Timeframe and Sources*

The study takes a long-term view of ECoC-related urban development, from planning through implementation to legacy, with a focus on how cultural and infrastructural investments contribute to sustainability. The analysis in Győr covers the period from 2010 to 2024, encompassing both the bids for the European Capital of Culture (ECoC) and the subsequent urban strategies developed during this time. This study draws on a variety of data sources, including ECoC bid books, municipal strategic plans, evaluations, and peer-reviewed academic literature.

## Results & Case Study Analysis

In the frame of results, the paper introduces and analyzes three cases that exemplify diverse trajectories of culture-based urban development within the context of the

European Capital of Culture (ECoC) programme. These case studies — Pécs (2010), Veszprém–Balaton (2023), and Győr (non-ECoC) — are examined to explore how cities have integrated cultural investment with ecological planning, community participation, and long-term sustainability strategies. Rather than treating ECoC solely as a cultural designation, the study positions it as a potential platform for systemic urban transformation. The selected cases reflect contrasting approaches: from infrastructure-focused development with limited civic embeddedness in Pécs, to a more decentralised and ecologically attuned model in Veszprém, and a strategic, university-driven vision in Győr, which unfolded outside the formal ECoC framework. Together, they offer critical insight into how cultural planning can, or cannot, align with broader urban ecological agendas. The section begins with the case of Pécs, the first Hungarian city to be awarded the ECoC title, whose ambitious programme generated considerable cultural infrastructure but raised significant questions regarding integration, sustainability, and civic legacy.

***Case 1. Pécs 2010***

### *1.1 Cultural Development with Structural Challenges*

Pécs became the first Hungarian city to receive the European Capital of Culture (ECoC) title in 2010. The programme aimed to raise the city's international profile, stimulate social and economic development, and modernise its cultural infrastructure. Although several major projects were completed, their long-term impact on sustainability and urban ecology remains mixed (Koltai, 2011). One of the most visible outcomes was the large-scale investment in cultural infrastructure. A key project was the Kodály Centre – a concert and conference hall that cost around HUF 4 billion and received 79,368 visitors in 2012, surpassing the initial expectation of 50,000 visitors per year (Pálné Kovács, 2013). Another major development was the Zsolnay Cultural Quarter, a 5-hectare brownfield site transformed from a former porcelain factory into a space combining cultural, educational, and tourism functions. It included museums, workshops, event spaces, and university buildings. In 2012, the complex attracted 246,000 visitors, of whom 204,000 were paying guests, indicating real public interest (Bozsoki and Szabó, 2024). However, due to its peripheral location and poor transport connections, the area was not well integrated into the city. The creative industries failed to take root, and energy efficiency and sustainability were not core priorities in their design. The third major investment was the South Transdanubian Regional Library and Knowledge Centre, which became the largest knowledge hub in the region. It offers public library services, study spaces, and university facilities, serving as a pillar of knowledge-based urban development (Horváth, 2011). Other developments included the expansion of Museum Street, upgrades to exhibition venues, and public space renovations in the city centre and the Uránváros housing estate. Although the scale of development was impressive for a city like Pécs, institutional capacities and local governance structures were often unprepared for the demands of the programme (Szijártó, 2011).

### *1.2 Public Spaces, Urban Fabric, and Ecological Challenges*

Beyond the headline projects, one of the programme's goals was to revitalise parts of the urban fabric, particularly through redesigning public spaces in the historic centre and

in Uránváros. The improvements to Museum Street, Kossuth Square, and areas around Széchenyi Square enhanced the use of public space and reinforced the symbolic function of these central areas (Szijártó, 2011). However, most interventions focused on visual and functional aspects, while environmental and climate-adaptive elements were largely missing. Aspects such as green space integration, microclimate enhancement, or sustainable design were not prioritised (Horváth, 2011). While pedestrian zones and new urban furniture supported the use of public spaces for cultural events, the transport system and parking infrastructure were not redesigned. Ecological urban planning tools, like permeable surfaces, shading, or urban heat island mitigation—were scarcely applied. Therefore, although public spaces were visually upgraded, their ecological sustainability remains questionable (Beatley, 2000; Kovács, 2013).

### *1.3 The Cultural Year's Programme Concept and Its Limitations*

The "Borderless City" concept aimed to position Pécs not just as a Hungarian Cultural hub, but as a bridge between Western Europe and the Balkans (Berkecz, 2011). Although thematically ambitious, the symbolic structure — divided into Reckoning, Carnival, and Change of Rhythm – was weakly connected to the actual programme and lacked cohesive implementation (Szijártó, 2011). Initial thematic years (e.g., Heritage, Environmental Culture) remained mostly formal. A key goal was economic revitalisation through culture, particularly expanding cultural industries and tourism. Despite infrastructure like the M6 motorway, no breakthrough occurred: creative sectors didn't take root, and tourist numbers stayed below projections. Most visitors came for museums and cityscapes, not events. The short average stay (1.8–2.3 nights) and price sensitivity further limited the success of paid events (Koltai, 2011). The programme received HUF 44.5 billion (35 billion for infrastructure, 9.5 billion for programming), highlighting a strong emphasis on physical development (Lähdesmäki, 2011). However, structural integration was lacking. New venues were not well embedded socially or spatially (Garcia, 2004), and ecosystem-like, decentralised cultural networks did not emerge (Richards, 2021). Transport infrastructure was largely absent. Facilities like the Kodály Centre or Zsolnay Quarter lacked public transit connections. Spatial and accessibility considerations were missing (Clark and Dickson, 2003), and only minor improvements were made to pedestrian and cycling options. Sustainability was not prioritised: energy-efficient designs, green technologies, or climate-sensitive planning were marginal (Beatley, 2000; Pickett *et al.,* 2011). Cultural participation also suffered. Civil society and residents had limited involvement, with most collaborations following a top-down model (Pálné Kovács, 2013). While some local initiatives existed, they were not structurally integrated. Centralized governance blocked community-led strategies (Póla, Pálné Kovács and Gibárti, 2023), contradicting the ideals of the creative city model (Florida, 2002; Landry, 2000). In sum, despite substantial cultural investment, the programme did not create lasting urban-ecological or participatory structures. It left a physical legacy but failed to deliver sustainable, systemic change.

### *1.4 Sustainability and Cultural Ecosystem: Missed Opportunities*

The environmental dimension of the Pécs 2010 programme reveals that urban development did not follow international sustainability principles. Energy efficiency, ecological infrastructure, and resource-conscious planning were largely ignored during

both construction and event organisation (Berkecz, 2011). Climate awareness was not a priority, despite other ECoC cities, such as Essen, Linz, and Turku, already applying green technologies and carbon-reducing solutions at the time. Although the city's cultural infrastructure expanded significantly, an organic, network-based cultural ecosystem failed to develop. The cooperation between the civil and creative sectors was not encouraged. Instead, the programme followed a top-down, institution-focused logic that hindered long-term cultural innovation and community vitality (Granovetter, 1973; Throsby, 2001).

### *1.5 Reshaping Cultural Identity*

During the ECoC year, more than 4,000 cultural events were organised across Pécs, the Southern Transdanubia region, and partner cities abroad. About 2,700 events were officially recognised (Müller, 2011). While visitor numbers increased, most programmes were free, which may distort actual levels of cultural engagement. Only a few thousand residents, out of approximately 160,000, were considered regular cultural participants. The large student body of the University of Pécs was not effectively reached, leaving much of its potential untapped. Although tourism rose slightly, there is no precise data about which events visitors attended or how deeply they engaged. Foreign feedback often pointed to shortcomings in infrastructure, closed-off cultural venues, and limited hospitality options (Koltai, 2011). Community-based events like "Varázskert" and "Kultucca" successfully encouraged participation, but these initiatives were not integrated into the main programme. The hierarchical structure discouraged networking and long-term cooperation, hindering the development of a sustainable cultural ecosystem. A lack of thematic unity, fragmented programming, and limited civic involvement meant that the ECoC year had little lasting impact on the city's social fabric or identity (Szijártó, 2011). Nevertheless, the programme contributed to cultural self-reflection. New venues and symbols – such as the Kodály Centre and Zsolnay Quarter – reshaped how locals perceived their city and its cultural role. Some short-lived collaborations emerged between the university, civil organisations, and cultural institutions, leaving behind a memory-based cultural imprint. Resident feedback showed a major shift in attitude: in 2009, only 12.4% expressed intent to participate, but by 2011, 66% viewed the programme positively (Koltai, 2011). While participation and activity increased, no long-term partnership model was developed. Scholars criticised the programme's centralised control and limited civil inclusion (Pálné Kovács, 2013). Post-ECoC development documents, like the "Pole Programme" or the "Borderless City" vision, lacked internal consistency. The ECoC concept gradually became a symbolic label rather than a grounded urban strategy (Kovács, 2013; Tarrósy and Komlósi, 2014). In conclusion, the legacy of Pécs 2010 is complex: it left visible infrastructure and a cultural identity shift, but decentralisation, sustainability, and structural embedding were only partially achieved. Instead of viewing the program as a simple success or failure, it should be recognized as a learning process. The long-term impact was limited by the city's insufficient institutional learning capacity. Centralisation, institutional rivalry, and the absence of partnership mechanisms prevented systemic cultural innovation (Pálné Kovács, 2014).

## *Case 2. Veszprém-Balaton 2023*

### *2.1 Sustainability and Culture in Networked Urban Development*

The Veszprém–Balaton 2023 European Capital of Culture (ECoC) programme can be seen not only as a thematic cultural season but as a complex model of regional development and social innovation. Its strategic foundation lies in the KRAFT (Creative City, Sustainable Countryside) concept, developed by the Institute of Advanced Studies Kőszeg (iASK), which integrates "soft" elements (cultural, community-based, and identity-driven) with "hard" infrastructure and economic development through an interdisciplinary approach (Miszlivetz and Márkus, 2013). KRAFT connects urban and rural areas, offering synergies and pathways for complex regional strategies. Based on this, the Veszprém ECoC bid aimed to activate a cultural and ecological network of 116 settlements, turning the Bakony-Balaton area into a decentralised cultural ecosystem. The programme was guided by the BEYOND concept, which promoted small-town innovation, community self-organisation, and sustainable development (VEB2023 Bidbook, 2023). Its novelty was not only spatial but also methodological. As described by Szabó *et al*. (2021), KRAFT is a "living concept" that relies on cooperation among local actors in the fields of economy, culture, and society. The model applies the quintuple helix framework, emphasizing collaboration among science, economy, government, civil society, and nature. In line with this, VEB2023 was not only about cultural and aesthetic projects but also introduced new models of cooperation, decentralised operations, and integrated spatial planning. It aligned with both international urban trends and the local KRAFT model, treating culture as a policy tool to regenerate and structure regional ecosystems.

### *2.2 Reimagining Space, Mobility Innovations, and Cultural Decentralisation*

One of the most visible results of the VEB2023 programme was the creative reuse of urban space, especially through brownfield revitalisation. A leading example is the Gyárkert KultúrPark, which transformed an abandoned industrial area into a summer cultural venue and public space (VEB2023 Bidbook, 2023). This was both a physical transformation and a cultural innovation, as it supported community life within the urban environment. Another important case is the ActiCity Dance and Movement Arts Centre, where a former children's hospital was repurposed into a modern cultural space (Bozsoki and Szabó, 2024). Both developments applied adaptive reuse and ecological urban planning, contributing to the city's long-term cultural ecosystem (Navracsics, 2023). The programme also introduced green mobility innovations. These included the ECoC train ticket, an e-bike system, traffic-calmed city zones, new pedestrian areas, and community marketplaces. These were complemented by the "Zero Footprint Zone," which focused on energy efficiency, waste reduction, and minimising environmental impact at event sites (VEB2023 Bidbook, 2023). Cultural decentralisation and civic participation were also key. The Pajta Programme brought rural venues – like village halls, barns, and churches– into the ECoC network. With its bottom-up structure, local communities were not just audiences but active contributors, which strengthened democratic access to culture (Lőrincz, Raffay-Danyi and Cerquetti, 2021; Morvay, 2019).

### *2.3 The University of Pannonia and Knowledge-Driven Urban Development*

The University of Pannonia was not just a partner in logistics and education during the Veszprém–Balaton 2023 ECoC programme – it became a central hub in the region's knowledge network. The university coordinated several educational and community-based projects related to social innovation, cultural intelligence, and sustainability education (Kővári, Pásztor and Raffay-Danyi, 2021). This cooperation between the city and the university was not ad hoc: instead, it created long-term synergies, where institutional knowledge and the ECoC cultural framework reinforced each other. The university played an active role in the creation of the Bidbook – developing indicators (e.g., the "Beyond Factor"), shaping evaluation frameworks, and building scientific foundations for regional partnerships (Lőrincz and Raffay, 2019). One focus area was the relationship between cultural heritage and sustainability, which was analysed in depth by university researchers. As highlighted by Kővári, Pásztor and Raffay-Danyi (2021), heritage is not only about preserving the past but can also be a current economic and social asset. Projects related to heritage can generate local employment in creative sectors such as monument conservation, tourism, and artisanal industries. Furthermore, heritage strengthens symbolic identity and collective memory, contributing to social cohesion. This interpretation also supports settlement retention, helping towns and villages attract or keep residents. Seen through the lens of sustainability, cultural heritage becomes a strategic, dynamic tool – aligning with the UN's Sustainable Development Goals and reflecting successful practices from other European ECoC cities.

### *2.4 Environmental Sustainability and the Green Perspective*

The VEB2023 sustainability programme delivered results in the environmental domain, along with positive social and cultural impacts. The ReCup system introduced 46,000 reusable cups, which significantly reduced single-use plastic waste. The programme's overall ecological footprint dropped by around 3% compared to 2022, mainly due to an increase in public transport use (35.9%) and green mobility solutions. Installing 22 drinking water fountains at event sites helped reduce bottled water use. The total carbon savings were estimated at 400 tonnes per year, equal to the annual $CO_2$ absorption of around 16,000 trees (25 kg per tree/year), offering a powerful symbolic result as well (www.veszprembalaton2023.hu).

Transport infrastructure also improved: new bike paths were built, an e-bike system launched, the bus fleet was upgraded, and digital passenger information systems were introduced. In addition to practical mobility, these changes also promoted environmental awareness. Apart from the numbers, their success also lay in strengthening identity and collaboration across 116 municipalities. Sustainability measures were not add-ons – they were part of the programme's core structure. Protected areas like NATURA2000, the Balaton Uplands National Park, and UNESCO World Heritage nominations were deeply embedded into cultural planning. Ecology was also present as a cultural dimension, especially through the MOME x BALATORIUM project, led by the Moholy-Nagy University of Art and Design (M-NU, 2023). It combined art, science, and environmental awareness through workshops and installations about the Balaton ecosystem. Social sustainability also featured as a key priority. The programme focused on family-friendly events, accessibility for people with disabilities, and community involvement. More than

500 volunteers helped organise and run the events, building a strong sense of local engagement. Selective waste collection, special dietary options, and inclusive event spaces made VEB2023 a model where sustainability was not just a goal – it was a guiding principle in everyday practice (Formádi, Kővári and Banász, 2024). One of the most important aspects of the VEB2023 programme was that sustainability was not merely treated as an add-on goal, but rather as a structural principle embedded into event planning, transportation, and community space development. This approach aligns with the circular economy model, which — as Potryvaieva *et al*. (2024) argue — requires not only resource efficiency but also a shift in societal attitudes and participatory practices. The reuse cup system, selective waste collection, and the use of e-bikes and green transport solutions demonstrate how culture can mediate the environmental, social, and economic dimensions of sustainability in practice. Furthermore, the VEB2023 programme underscores how environmentally conscious urban initiatives can also generate positive psychological and social effects. Recent interdisciplinary findings highlight that urban greening, green infrastructure, and ecological awareness may enhance psychological well-being, social connectedness, and cognitive comfort – thus reinforcing the social quality of life (Nesprava *et al*., 2025).

### *2.5 Cultural Ecosystem and Network Building: The Stratification of Cultural Identity*

The long-term impact of the Veszprém–Balaton 2023 European Capital of Culture (ECoC) programme is currently being assessed by a 2024 study conducted by the Institute of Advanced Studies Kőszeg (iASK) and Závecz Research. Their representative survey of 1,200 respondents explores changes in urban liveability, identity, and cultural attitudes compared to 2017 baseline data (Závecz Research, 2024). With more than 3,000 events, the programme not only expanded cultural offerings but also reinforced regional cultural self-organisation. Small-scale institutions, local knowledge platforms, and informal communities became active agents in cultural development, supported by a decentralised governance structure and cooperation among 116 municipalities. This contributed to the formation of a multi-layered regional cultural identity. Over 1.66 million visitors were recorded in Veszprém's city centre alone, with 80% of events offered free of charge — demonstrating a strong push towards the democratisation of cultural participation. Besides functional purposes, infrastructure investments – such as the Gyárkert KultúrPark, ActiCity Movement Arts Centre, Foton Audiovisual Centre, the renewed Castle District, and the Ruttner House – also carried symbolic significance. These venues strengthened the local cultural ecosystem and now act as community spaces for both residents and visitors (Navracsics, 2023).

### *2.6 Brownfield Revitalisation Community Spaces: Gyárkert, ActiCity, and the Historic City Centre*

One of the key urban developments of the Veszprém–Balaton 2023 European Capital of Culture (ECoC) programme was the Gyárkert KultúrPark, which transformed the 2.3-hectare site of the former Balaton Furniture Factory into a public cultural venue. This previously neglected industrial site was reimagined as a multifunctional space for concerts, culinary events, and family programs, with a capacity of 5,000 people. A symbolic feature, the Community Garden – with planter boxes representing 116 participating municipalities– underscored the collaborative nature of the initiative. After

the season, these planters were returned to their home settlements, creating a lasting regional legacy. The project received international recognition by being selected for the Green Destinations Top 100 Stories in 2024, highlighting its environmental, economic, and community value (VEB2023 Bidbook, 2021). The ActiCity Dance and Movement Arts Centre exemplifies adaptive reuse. A former children's hospital was fully restored while preserving its historical facade. The interior was redesigned to host dance studios, rehearsal rooms, performance halls, and community workshops. The building features energy-efficient upgrades (insulation, ventilation, LED lighting) and full accessibility. ActiCity now operates as a creative hub and inclusive cultural institution – recognised as one of the long-term legacies of the ECoC. The revitalisation of Veszprém's city centre included the Castle District, the Petőfi Theatre complex, the Ruttner House, and key public spaces. Projects combined historic preservation with sustainable urban design, expanding pedestrian zones, improving facades, and introducing green corridors, permeable pavements, and climate-adaptive landscaping. The Petőfi Theatre's auxiliary buildings have been renovated, while the modernisation of the main building is scheduled for 2024. The FOTON Audiovisual Centre reused industrial heritage as a passive house facility supporting film, sound art, and media education (www.veszprembalaton2023.hu). The CODE Veszprém – Centre of Digital Experience is being developed as an interactive museum and learning space for art, science, and the natural world (www.codeveszprem.hu). These developments reflect infrastructure upgrades as well as a shift in urban thinking. Sustainability, community participation, and cultural reimagination became guiding principles. Previously underused sites were given new cultural purposes, contributing to a liveable, inclusive cityscape. The programme's success lies not only in metrics: the cooperation of 116 municipalities and the continuation of cultural events in 2024 (e.g., Holtszezon Festival, Gizella Days, and Hungarian Motion Picture Festival) suggest that VEB2023 created more than a temporary cultural moment – it sparked a paradigm shift. The city received major accolades: 7th place in European Best Destinations 2023, designation as a UNESCO City of Music, and Europe's Most Liveable City in its category. Overnight stays rose by 17%, confirming the economic and cultural impact (NTAK, 2023). These achievements point toward a broader transformation in urban cultural strategy. The Veszprém–Balaton 2023 European Capital of Culture programme set a new standard in Hungary for culture-based and sustainable urban development. Its decentralised structure, strong ecological focus, and active community participation produced lasting cultural, social, and environmental results. Key ideas – like experience-based participation and cultural ecosystem — were not just concepts but shaped real-world practices. VEB2023 was more than a one-year cultural season. It followed a strategic, long-term development model rooted in the KRAFT philosophy (Creative City – Sustainable Countryside), which promotes cooperation between small towns, use of local cultural assets, and knowledge-based planning (Miszlivetz and Márkus, 2013). This model supports regional development through network-building, sustainability, and civic engagement. It also helps to rebalance centre–periphery dynamics by involving local communities in planning and implementation (Jakobi *et al.,* 2024). In this way, VEB2023 functioned both as a cultural event and a model for decentralised, inclusive, and ecologically conscious regional renewal.

## *Case 3. Győr*

### *3.1 In the Shadow of a Missed Title: Structured Cultural Policy and Strategic Ambitions – Lessons from the 2010 ECoC Bid*

Győr first applied for the European Capital of Culture (ECoC) title for the year 2010. Although the city reached the final shortlist, it ultimately lost to Pécs. The second round of the selection process reflected broader public policy dynamics, showing how a regional city tried to reposition itself culturally beyond the shadow of Budapest (Somlyódy, 2005). A core challenge was whether Győr could articulate a European-level cultural vision, one that went beyond local identity or institutional development. The bid proposed the creation of three new cultural institutions—the Museum of Neotechnology, Palace of Generations, and a Media Centre — located outside the city centre and connected by a planned tram line. These were part of a broader plan integrating innovation, industry, and culture, aiming to support the knowledge economy and creative industries (Pilkhoffer, 2011). It also included reusing industrial heritage sites. However, by the second round, several original ideas were dropped in favour of a more tourism-oriented concept. In contrast to Pécs, Győr's strategy lacked decentralisation, regional integration, and participatory elements that had strongly impressed the jury. According to the final evaluation, Pécs "took the concept of cultural urban development most seriously" by embedding its plans in a European, bottom-up framework (Somlyódy, 2005). In their critiques, commentators identified both technical and conceptual shortcomings. The bid lacked long-term sustainability and an inclusive social vision. Many of its proposals appeared fragmented or ad hoc. Still, some of the original ideas — like festival hubs, thematic city days, or the reuse of industrial areas – were later reintroduced in the city's cultural policies. The lost bid did not end Győr's ambitions. Instead, it became a catalyst. In 2010, the city launched a new cultural strategy that included branding campaigns such as "Meet Me in Győr 2010" and the Four Seasons Festival, establishing consistent and seasonally structured events to strengthen local identity and tourism appeal (Lipovits, 2010). The strategy was supported by a robust city-wide marketing and communication effort. Győr's cultural infrastructure also continued to grow. Institutions such as the Győr National Theatre, Győr Ballet, Győr Philharmonic, Vaskakas Puppet Theatre, and Rómer Flóris Museum became vital pillars in the city's cultural ecosystem. New flagship events emerged, such as the Baroque Wedding, Győrkőc Festival, Mediawave, Rómer Jazz Festival, and the Five Churches Festival — highlighting that a cohesive and long-term cultural ecosystem was achievable even without the ECoC title. The ECoC process, rather than failure, became a driver for structured, forward-looking cultural development (Fekete and Morvay, 2020).

### *3.2 The "Flow" Concept: Győr's 2023 ECoC Bid*

Győr's second European Capital of Culture bid was structured around the "Flow" concept, symbolising social, cultural, and ecological currents. It was organised into three thematic pillars — WAY, CITY, and DIALOGUE – aiming to reinterpret the city's historical layers, activate creative communities, and foster European-level dialogue (Tóthné Kardos, Karácsony and Duschanek-Konta, 2019). The programme is built on the city's cultural institutions and iconic festivals like Győrkőc, Dance and the Five Churches Festival. While structurally stable, the bid lacked a coherent European vision.

According to the international jury, cross-border partnerships — especially with Austrian and Slovak actors—were underdeveloped. Academic evaluations highlighted that ecological and sustainability concerns were marginalised (Fekete and Morvay, 2020). Compared to Veszprém, Győr showed strength in cultural infrastructure but lagged in community participation and social innovation.

### *3.3 Sustainability, Ecological Sensitivity in Győr's 2023 ECoC Bid*

The Flow concept symbolically linked natural systems — particularly water, information, and mobility — to cultural processes, opening space for sustainability discourse. Proposals included decentralised cultural venues, green space revitalisation, and a creative industry-based low-impact economy (Fekete and Morvay, 2023). However, the bid lacked concrete indicators and measurable commitments to reduce environmental impact. While the concept allowed for regional ecological cooperation, this potential was largely unrealised. Unlike Veszprém's networked approach across 116 municipalities, Győr did not present a strong decentralised regional model. The financial framework of the bid was more reliant on public funding, offering potential operational stability. Nonetheless, the environmental dimensions remained mostly symbolic. Evaluations noted that the Flow concept was flexible and inspiring but failed to deliver a sustainability-focused strategy. Planned projects such as the City Event Park and Design Incubator may still be realised outside the ECoC framework, offering potential continuity for parts of the vision.

Compared to Veszprém, Győr showed strength in cultural infrastructure but lagged in community participation and social innovation. While certain cultural and innovation-oriented reuse projects have been successfully implemented — such as the "Torula" independent contemporary art space located in the former distillery, and the substantial Science and Innovation Park developed by Széchenyi István University in the former Győr Biscuit and Wafer Factory — other flagship developments were never realised. These include the proposed Cultural Quarter, the full renovation of the city theatre, and the new concert hall envisioned for the Győr Philharmonic Orchestra, reflecting the limits of implementation despite strategic ambitions. Moreover, without holding the ECoC title, Győr did not benefit from targeted governmental funding for large-scale cultural infrastructure. The Hungarian Cities Programme (Magyar Városok Program) instead prioritised wellness, tourism, and infrastructural upgrades — such as the development of the thermal bath and the city zoo — rather than supporting comprehensive cultural regeneration.

### *3.4 A New Urban Knowledge Hub: The University as Cultural Laboratory*

The case of Győr demonstrates that a city can develop a coherent and long-term cultural and regional strategy even without winning the European Capital of Culture (ECoC) title—one that aligns organically with Europe's goals of sustainability, innovation, and community participation. One of the most stable institutional pillars in this process has been Széchenyi István University, which plays a defining role in shaping both the city's and the region's cultural ecosystem through its interdisciplinary education, research structures, and extensive network of regional partnerships. The university functions as an urban knowledge hub, integrating educational, research, social, and creative functions

into the fabric of the city. Through initiatives such as the Design Campus, the Faculty of Arts, and a variety of student-led programmes, the institution supports not only creative industries but also promotes social innovation and the dissemination of sustainability principles. These activities directly contribute to rethinking spatial use in the city and renewing its cultural infrastructure. During the preparation of Győr's 2023 ECoC bid, the university served not only as a professional partner but also as an intellectual centre, shaping the city's cultural vision in key areas such as historical layering, social dialogue, and regional cooperation. This role extends far beyond conventional academic boundaries: the university has become a living laboratory for creative and social experimentation, capable of generating new models of sustainable urban development. This points toward a developmental trajectory on which Győr can continue to build in the future, anchored in a triad of knowledge, community engagement, and creative capacity, and offering a flexible and future-oriented model of cultural urban growth (Makai and Rámháp, 2020; Rákosi *et al*., 2022; Vasvári, Mayer and Vasa, 2020).

### *Comparative Urban Sustainability Strategies: Győr, Veszprém, and Pécs*

The 2023 European Capital of Culture (ECoC) competition represented more than a pursuit of cultural prestige—it served as a framework for cities such as Győr, Veszprém, and Pécs to align cultural policy with long-term sustainability objectives. All three cities formulated integrated strategies, including local climate plans, mobility frameworks, and Sustainable Energy and Climate Action Plans (SECAPs), in line with the EU's broader sustainability agenda (Covenant of Mayors, 2020). The reciprocal influence between the ECoC application process and sustainability planning was evident: the interdisciplinary logic of the ECoC framework encouraged innovation and cross-sectoral thinking, enabling cultural programming to support ecological awareness, community-centred design, and policy experimentation. Although each city adopted a culture-led development framework, the depth, internal coherence, and systemic integration of their approaches varied considerably. Győr envisioned decentralised green districts, enhanced public transport, and accessible cultural hubs, thereby embedding ecological awareness into urban life (Győr MJV, 2021, 2022). Veszprém's ecological legacy – from the Repohár reusable cup system to barn-based cultural venues — has become integrated into the city's routine operations (Veszprém MJV, n.d.). Pécs, meanwhile, prioritised the mitigation of heat island effects, the expansion of green roofs, and the reinterpretation of cultural spaces such as the Zsolnay Quarter as adaptive, community assets (Pécs MJV, n.d.). These examples suggest that culture and sustainability are not opposing agendas but mutually reinforcing dimensions of contemporary urban development. The ECoC application process functioned as a catalyst in this regard, accelerating the convergence of cultural programming and sustainability-oriented planning, regardless of whether a city ultimately secured the ECoC title (Mavrin, 2024) (Table 1). While the broad alignment of ecological and cultural priorities is evident across all three cities, the underlying governance logics, implementation pathways, and degrees of systemic integration diverge significantly. The comparative assessment presented below examines how Pécs, Veszprém, and Győr operationalised sustainability within their culture-led urban strategies.

The analysis is structured around four interlinked dimensions:

- Brownfield revitalisation and adaptive urban reuse
- Sustainable mobility and transport integration

- Civic participation and institutional engagement
- Environmental awareness embedded in cultural programming

These categories serve not only to highlight context-specific strengths and weaknesses but also to reveal underlying patterns of fragmentation or coherence in the cultural sustainability trajectories of the three cities.

Table 1: Comparison – Culture-Based Urban Sustainability in Three Hungarian Cities

| *Analytical Dimension* | *Pécs 2010* | *Veszprém-Balaton 2023* | *Győr (non-ECoC)* |
|---|---|---|---|
| Brownfield Revitalisation and Urban Space Use | Zsolnay Quarter (former porcelain factory) transformed, but poorly integrated; limited ecological design. | Gyárkert KultúrPark and ActiCity reused former industrial and institutional sites with ecological design principles. | Torula Art Space (former distillery) and the Science and Innovation Park (former biscuit factory) exemplify adaptive reuse with institutional backing. |
| Sustainable Mobility and Transport Solutions | Minor pedestrian zone extensions; transport infrastructure largely unchanged; limited green mobility. | Bike sharing, ECoC pass, new pedestrian zones, and city-calming measures are implemented across the region. | Mobility-related strategies are outlined in plans, but the practical implementation of green transport remains limited. |
| Community Participation and Civic Engagement | Top-down programming, limited public involvement; civil society largely excluded. | 116 municipalities actively engaged; bottom-up programs such as Pajta strengthened participation. | Civic participation is mostly linked to festivals and events; bottom-up engagement remains weak. |
| Environmental Awareness and Green Event Practices | Sustainability is not prioritized; minimal integration of climate-adaptive or green practices. | The ReCup system, water fountains, Zero Footprint Zone, and awareness campaigns reduced the ecological footprint. | Sustainability features in concept (Flow), but no robust environmental event framework is implemented. |

While table 1 provides a structured comparison of culture-based sustainability approaches across the three cities, it also exposes critical divergences in planning

paradigms, civic engagement mechanisms, and the degree of ecological integration. Pécs'strategy centred on cultural infrastructure development, yet lacked environmental embeddedness and participatory governance. Veszprém, in contrast, implemented a regionally decentralised model underpinned by ecological consciousness and multi-level civic involvement. Győr adopted an innovation-oriented approach yet fell short of establishing a robust participatory framework or systemic ecological alignment. These variations illuminate the extent to which local governance cultures, institutional capacities, and strategic priorities mediate the relationship between cultural programming and sustainability imperatives. Furthermore, they reveal that the European Capital of Culture (ECoC) designation can function either as a symbolic catalyst or as a platform for structural transformation, depending on how effectively the initiative is embedded within broader urban development logics. The subsequent Discussion section elaborates on these dynamics through engagement with the relevant theoretical literature and considers their implications for future culture-led urban sustainability practices.

### *Visualising Culture-Based Urban Sustainability: A Radar Model*

To synthesise the multi-dimensional sustainability profiles of the three cities, a radar chart was developed based on six analytical dimensions: cultural decentralisation, ecological integration, participatory governance, cultural continuity, adaptive reuse of brownfields, and strategic embedding. This framework is not intended for precise quantification but aims to provide a typological and visual interpretation of differing development logics. The scores (1–5 scale) were assigned through qualitative content analysis of programme documents, academic literature, and policy evaluations. While subjective elements are inevitable, the evaluation followed clearly defined criteria to ensure methodological transparency. The radar model suggests that Veszprém exhibits the highest level of systemic integration, while Pécs and Győr demonstrate more fragmented strategies, particularly in participatory governance and ecological alignment. The model also highlights that Veszprém's approach — though still ongoing — embeds sustainability across multiple policy layers, whereas Pécs reflects a legacy-oriented but symbolically loaded strategy, and Győr remains in a conceptually innovative yet institutionally partial phase. This diagram functions as a first attempt at developing an integrated evaluation framework for culture-based urban sustainability and may serve as a reference for future comparative studies on the European Capital of Culture initiative or similar urban innovation policies. While the European Commission applies a comprehensive set of more than 50 evaluation criteria to assess ECoC programmes, the simplified radar model presented here distils those complex metrics into six core strategic dimensions—thereby offering a more accessible tool for comparative urban analysis and preliminary typologisation.

This radar chart synthesises six key dimensions of culture-based urban sustainability — cultural decentralisation, ecological integration, participatory governance, cultural continuity, adaptive reuse of brownfields, and strategic embedding. Scores are based on a structured qualitative assessment of planning documents, programme materials, and secondary literature. While indicative rather than definitive, the model offers a visual typology of the strategic orientations characterising each city's approach to sustainable urban development within or beyond the European Capital of Culture (ECoC) framework.

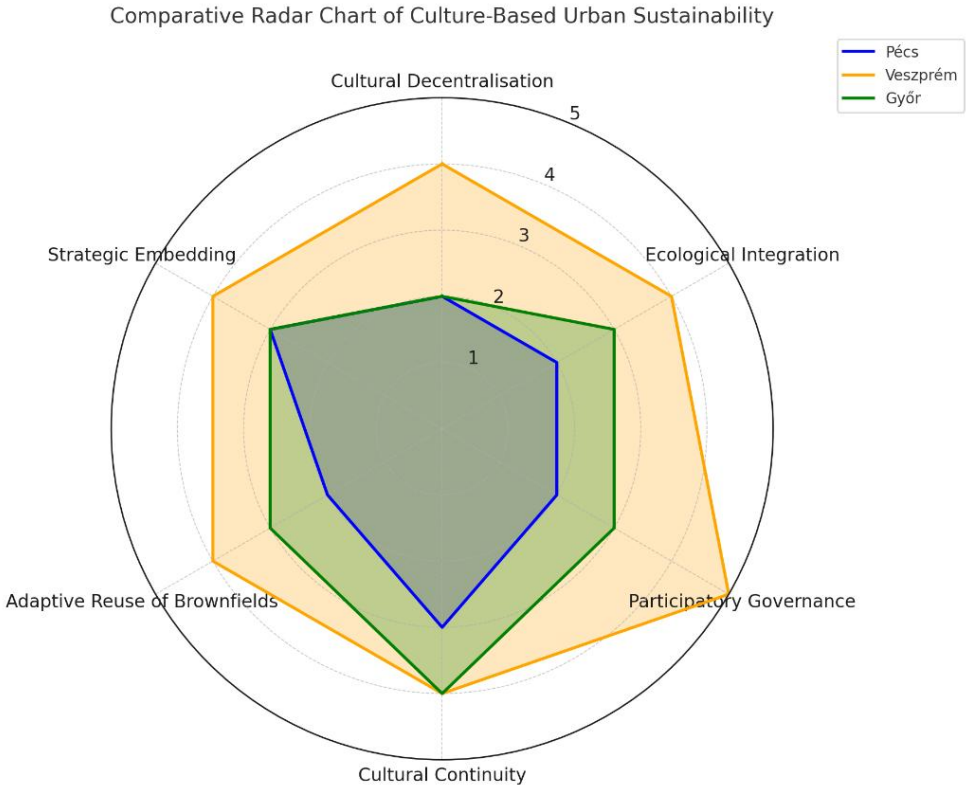


Figure 2: Radar Model of Culture-Based Urban Sustainability in Pécs, Veszprém, and Győr

## Discussion

This study has explored how urban ecological principles may be integrated into culture-based urban development strategies, using the lens of the European Capital of Culture (ECoC) framework. Drawing on the comparative experiences of Pécs (2010), Veszprém–Balaton (2023), and Győr (non-ECoC), the findings illustrate that the sustainability outcomes of culture-led urban strategies are not simply determined by cultural investment but are shaped by planning priorities, institutional arrangements, and the degree of civic inclusion. This comparison also reveals how different governance cultures and institutional histories conditioned each city's ability to embed ecological thinking within cultural policy frameworks. The divergent patterns observed across the three cases underscore the importance of systemic alignment between cultural, ecological, and spatial agendas — an alignment increasingly emphasised in the literature on creative cities (Florida, 2002; Landry, 2000), regenerative urbanism (Evans, 2005), and socio-ecological systems (Pickett *et al*., 2011).

In Pécs, the focus of the ECoC programme was primarily on the development of cultural infrastructure, with major investments including the Kodály Centre, the Zsolnay Cultural Quarter, and the Regional Library and Knowledge Centre of Southern Transdanubia. While these projects undoubtedly enhanced the city's visibility and cultural assets, they paid limited attention to ecological integration. As noted by Horváth (2011) and Berkecz

(2011), green urban planning tools — such as climate adaptation, resource efficiency, or sustainable transport—were largely absent. Public participation remained limited throughout the programme, which followed a predominantly top-down planning logic with minimal opportunities for civic co-design or stakeholder deliberation. This omission, however, was not merely a technical oversight but rooted in a broader planning culture that prioritised symbolic capital over systems-based thinking. The city's developmental logic reflected a desire to create internationally recognisable cultural icons, rather than to transform the urban metabolism in line with ecological principles.

This pattern aligns with Garcia's (2004) critique that event-led cultural regeneration, when disconnected from civic engagement and long-term sustainability, tends to result in symbolic spectacles rather than embedded transformation. The highly centralised governance structure, coupled with minimal opportunities for co-design and stakeholder deliberation, further undermined the formation of a participatory cultural ecosystem. Moreover, the lack of decentralisation and horizontal cultural planning in Pécs contradicts the principles articulated by Landry (2000) and Florida (2002), who argue that a truly creative city requires distributed governance, local ownership, and culturally embedded innovation networks. Although creative and cultural industries were formally included among the programme's objectives, they failed to achieve structural integration within the city's social and economic systems. Institutions operated in silos, civil society initiatives lacked long-term support, and the creative economy never consolidated beyond the ECoC year. This institutional fragmentation and the absence of systems thinking ultimately limited Pécs's ability to adapt to urban sustainability challenges in the post-ECoC phase, confirming Evans's (2005) warning that without embedded governance structures, culture-led urbanism may fail to achieve durable regeneration. From a socio-ecological perspective, the Pécs case did not approach the adaptive integration of ecological and cultural systems described by Pickett, Cadenasso and McGrath (2011), wherein cities evolve as co-constructed socio-environmental systems.

By contrast, the Veszprém–Balaton 2023 ECoC programme demonstrates a more advanced and structurally embedded integration of sustainability within cultural planning. The initiative was grounded in the KRAFT (Creative City–Sustainable Countryside) framework (Miszlivetz and Márkus, 2013), and mobilised a decentralised network of 116 municipalities, aligning cultural investment with ecological awareness and civic innovation. This regional, polycentric model enabled the emergence of a collaborative governance ecosystem that addressed not only cultural ambitions, but also broader goals related to environmental resilience and social cohesion. Projects such as the adaptive reuse of brownfield sites (e.g., Gyárkert KultúrPark, ActiCity), the implementation of green mobility systems (bike-sharing, the ECoC train pass), and participatory cultural programming (e.g., Pajta Programme) illustrate a multidimensional approach to sustainability. These practices embody what Hawkes (2001) described as the "fourth pillar" of sustainability, where culture functions not as an aesthetic supplement but as an integrative force across environmental, economic, and social domains. The programme's logic also aligns with the urban ecological systems theory proposed by Pickett, Cadenasso and McGrath (2011), which frames cities as co-evolving socio-environmental systems. Veszprém's planning practices reflected this paradigm through the creation of feedback loops between cultural identity, ecological awareness, and civic trust. These interdependencies manifested in measurable outcomes,

including elevated levels of public engagement and social trust, as evidenced by a large-sample public opinion survey presented at the programme's international closing conference (Szabó, 2024).

This systemic coherence resonates with Evans' (2005) concept of regenerative urbanism, wherein sustainability is not achieved through singular flagship investments, but through decentralised, long-term, cross-sectoral collaborations grounded in place-based identity and governance. Veszprém's legacy lies in precisely these multi-layered forms of cooperation, spatial regeneration, and institutional learning, positioning it as a rare example of an ecologically conscious, culture-led urban development model in the Central European context.

Győr, though not awarded the ECoC title, offers a compelling case of culture-based urban development that sought to integrate ecological awareness into long-term planning. The city's 2019 Flow concept—formulated as part of its ECoC bid—outlined a decentralised cultural strategy rooted in knowledge-based innovation and creative industry support. Although the bid ultimately proved unsuccessful, it catalysed a strategic agenda that continued to evolve independently of the ECoC framework. Unlike Veszprém's polycentric regional approach, Győr pursued an institutionally anchored model, relying on the city's robust cultural infrastructure, academic ecosystem, and municipal planning capacity. Collaborations with Széchenyi István University, as well as the support of local creative initiatives — such as Torula Art Space and the Science and Innovation Park — signalled a potential for bottom-up, place-based cultural regeneration. However, the absence of a regionally networked delivery structure and limited civic co-design processes curtailed the systemic embedding of sustainability principles. This highlights the importance of distributed governance and civic engagement, emphasised by Landry (2000) and Florida (2002), who argue that the "creative city" must be driven not only by institutions, but by participatory cultural networks and locally embedded innovation ecosystems. The Flow concept made reference to key aspects of ecological urbanism — such as adaptive reuse and sustainable mobility — but lacked the structural indicators, evaluation mechanisms, and intermunicipal collaboration that characterised the Veszprém–Balaton model. As such, Győr's planning logic remained internally coherent, yet externally isolated, demonstrating what Pickett, Cadenasso and McGrath (2011) would classify as an incomplete socio-ecological systems model. Nevertheless, the city's sustained focus on thematic, year-round festivals and its investment in creative knowledge hubs lend support to Evans' (2005) assertion that durable cultural regeneration does not require high-profile mega-events. Rather, it depends on the long-term alignment of institutional capacity, local identity, and cross-sectoral partnerships. In this regard, Győr illustrates that a cultural–ecological strategy is feasible even without the symbolic capital of the ECoC title, provided that internal vision and political continuity are maintained.

## Limitations and Future Research Directions

One of the key limitations of this study is its focus on only three Hungarian cities, which means that the findings are not fully generalisable across the broader European Capital of Culture (ECoC) landscape. The evolution of the culture–ecology relationship within the ECoC framework between 1985 and 2025 highlights the need for further comparative

research at the European level, especially regarding the use of green indicators and long-term impact assessments. In the case of Veszprém, the ex-post evaluation of the 2023 programme was not yet available at the time of writing, as such assessments can only be conducted after the end of the programme, typically within 12 to 24 months. This currently limits the analysis of long-term effects. Although Győr did not receive the ECoC title, initiating a comprehensive evaluation process there would also be advisable, particularly from the perspective of long-term urban planning and forward-looking development. Such an evaluation could focus on the lessons learned from the city's two unsuccessful bids and examine how its independent cultural–ecological strategy could be further developed.

The European Commission's evaluation framework assesses the outcomes of ECoC programmes through a detailed, multidimensional set of criteria, including cultural impact, urban development, international visibility, community perceptions, and strategic embedding. This carefully elaborated methodology is not only suitable for evaluating the effectiveness of the ECoC title itself but could also serve as a transferable model for broader urban development strategies, especially in contexts where culture and ecology are treated as integrated, long-term strategic components.

In this context, the simplified radar chart model developed in this study — though based on a small number of cases and a qualitative assessment — may offer a preliminary reference point for further comparative and evaluative tools. As more European cities aim to adopt integrated development models grounded in the "four pillars" of sustainability, such typological visual frameworks may help initiate more participatory, scalable, and strategically aligned evaluation processes. By distilling core insights from the ECoC experience, including elements of regional identity, civic participation, and ecological embedding, this model contributes to a broader dialogue on how cultural policy can evolve into a long-term urban transformation instrument.

Recommended directions for further research include:

- exploring cultural ecosystems through a network-based approach, with particular attention to both formal and informal collaborations
- conducting longitudinal impact studies following the closure of programmes and festivals, and increasing the collection of quantitative data
- examining how existing urban ecological indicator systems can support the adaptation of best practices to local social, economic, and spatial contexts
- developing methodological recommendations on how reflective evaluation can become not only a requirement but an integral part of urban planning and decision-making – for example, through urban dashboards, locally tailored indicators (e.g., "BEYOND Factor", "Győr Flow Index"), participatory feedback mechanisms, age-appropriate communication platforms, and the inclusion of independent evaluation bodies
- designing communication and engagement tools that promote the social dissemination of cultural and professional content, especially in forms aligned with age-specific preferences, such as interactive forums, targeted surveys, school workshops, and open-access data visualisation platforms.

## Conclusion and Key Findings

This study, through the examples of three Hungarian cities – Pécs, Veszprém, and Győr – demonstrated that culture-based urban development can only become genuinely sustainable if it is embedded in an ecological systems approach. The European Capital of Culture (ECoC) programme is not merely a one-year cultural event series; rather, it offers an opportunity to strategically integrate urban ecological principles into development practices. Pécs's 2010 programme laid the foundation for expanding cultural infrastructure but lacked structural embeddedness and ecological reflection. In contrast, Veszprém's 2023 programme emerged as a networked, community-led, and environmentally conscious model. Győr's example proves that even without receiving the ECoC title, a coherent cultural–ecological strategy can be developed, provided the appropriate social and institutional conditions exist. This study aimed to examine how urban ecological principles can intersect with culture-based urban development initiatives in contemporary urban policy practice. The analysis compared the differing ECoC experiences of three cities – Pécs, Veszprém, and Győr.

Based on the research, the following conclusions can be drawn in response to the analytical questions outlined in the Introduction:

- Culture-based urban development can significantly contribute to sustainability goals, provided it is not pursued in isolation but embedded within urban ecosystems. Veszprém offers the most effective model in this regard. Developments linked to the ECoC title can truly support sustainability only if culture is treated as an instrument of urban policy rather than as decoration.
- Urban ecological principles – such as brownfield redevelopment, green mobility, and the use of communal spaces – appeared in all three cities, but only in Veszprém were they structurally integrated. Therefore, a decentralised, community-centred, and nature-based approach appears to be the most effective.
- Győr's case confirms that a cultural–ecological synergy can be established without the ECoC title, particularly when supported by institutional frameworks, political will, strategic documents, and a decentralised mindset.
- Culture is thus not merely an aesthetic or identity-bearing element but a structural component in achieving economic, social, and environmental sustainability.

As the examples of Veszprém and Győr illustrate, culture increasingly acts as a strategic catalyst in sustainable urban development, far beyond decorative or event-based roles. There is a gradual shift from symbolic, short-term cultural initiatives towards embedded, systemic, and participatory cultural governance. This is particularly relevant considering the Hungarian cases, where building cultural ecosystems and fostering civic engagement are fundamental to integrated and resilient urban transformation.

Culture-based, ecologically oriented urban development is therefore not a closed chapter but an ongoing, transformative process, one that redefines what it means to be a creative, liveable, and sustainable city in the 21st century. ECoC-related developments can only be truly effective when culture functions not merely as an aesthetic supplement but as a strategic tool for urban policy and city branding. Ultimately, the success of such

strategies depends not only on frameworks like ECoC but on strong local commitment, long-term vision, and interdisciplinary collaboration. This approach can be most successful when reinforced by institutional partnerships, knowledge networks, and active public participation.

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## Authors' Declarations and Essential Ethical Compliances

*Authors' Contributions (in accordance with ICMJE criteria for authorship)*

| *Contribution* | *Author 1* | *Author 2* | *Author 3* |
|---|---|---|---|
| Conceived and designed the research or analysis | Yes | Yes | Yes |
| Collected the data | Yes | No | No |
| Contributed to data analysis & interpretation | Yes | Yes | Yes |
| Wrote the article/paper | Yes | Yes | Yes |
| Critical revision of the article/paper | No | Yes | Yes |
| Editing of the article/paper | Yes | Yes | Yes |
| Supervision | No | Yes | Yes |
| Project Administration | Yes | No | No |
| Funding Acquisition | No | No | No |
| Overall Contribution Proportion (%) | 60 | 20 | 20 |

*Funding*
No financial support was received for the research and writing of this article. However, Széchenyi István University, Győr, Hungary has sponsored the publishing of this article.

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